AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Previously Presented) A method for depositing a copper seed layer onto a substrate surface containing a barrier layer, comprising:

exposing the substrate surface to a copper solution containing complexed copper ions and having a pH value of less than 7, wherein the complexed copper ions are derived from a copper source selected from the group consisting of copper citrate, copper borate, copper tartrate, copper oxalate, derivates thereof, and combinations thereof;

applying an electrical bias across the substrate surface; and

reducing the complexed copper ions with the electrical bias to deposit the copper seed layer onto the barrier layer.

2. (Currently Amended) The method of claim 1, wherein the barrier layer comprises a material selected from the group consisting of cobalt, ruthenium, nickel, tungsten, tungsten nitride, titanium, titanium nitride, ~~and~~ silver, alloys thereof and combinations thereof.

3. (Previously Presented) The method of claim 2, wherein the copper source is copper citrate.

4. (Currently Amended) The method of claim ~~3~~ 1, wherein the copper solution contains a copper concentration ~~of complexed copper~~ within the range from about 0.02 M to about 0.8 M.

5. (Previously Presented) The method of claim 4, wherein the electrical bias generates a current density of less than about 10 mA/cm^2 across the substrate surface.

6. (Previously Presented) The method of claim 5, wherein the current density is within the range from about 0.5 mA/cm^2 to about 3 mA/cm^2.

7. (Currently Amended) The method of claim ~~6~~ 5, wherein the copper seed layer has a thickness of less than about 200 Å.

8. (Currently Amended) The method of claim ~~7~~ 1, further comprising depositing a copper gap-fill layer by:

exposing the substrate to a second copper solution containing free-copper ions; and

applying a second electrical bias across the substrate surface to deposit the copper gap-fill layer onto the copper seed layer.

9. (Previously Presented) The method of claim 8, further comprising depositing a copper bulk-fill layer by:

exposing the substrate to a third copper solution containing free-copper ions; and

applying a third electrical bias across the substrate surface to deposit the copper bulk-fill layer onto the copper gap-fill layer.

10. (Original) The method of claim 9, wherein at least one leveling agent is added to the second copper solution to form the third copper solution.

11. (Currently Amended) A method for depositing a metal seed layer onto a barrier layer on a substrate surface, comprising:

exposing the barrier layer disposed on a substrate to a complexed copper solution containing complexed copper ions derived from a copper source selected from the group consisting of copper citrate, copper borate, copper tartrate, copper oxalate, derivates thereof and combinations thereof; and

reducing the complexed copper ions with an electroplating technique to form a copper seed layer on the barrier layer.

12. (Cancelled)

13. (Currently Amended) The method of claim ~~12~~ 11, wherein the barrier layer contains a material selected from the group consisting of cobalt, ruthenium, nickel, tungsten, tungsten nitride, titanium, titanium nitride, ~~and~~ silver, alloys thereof and combinations thereof.

14. (Previously Presented) The method of claim 13, wherein the copper source is copper citrate.

15. (Currently Amended) The method of claim ~~11~~ 14, wherein the complexed copper ~~source~~ solution has a copper concentration within the range from about 0.02 M to about 0.8 M.

16. (Cancelled)

17. (Currently Amended) The method of claim 14, wherein a first electrical bias ~~generates~~ having a current density of less than about 10 mA/cm^2 is generated across the substrate surface during the electroplating technique.

18. (Previously Presented) The method of claim 17, wherein the current density is within the range from about 0.5 mA/cm^2 to about 3 mA/cm^2.

19. (Currently Amended) The method of claim ~~18~~ 17, wherein the copper seed layer has a thickness of less than about 200 Å.

20. (Currently Amended) The method of claim ~~19~~ 11, further comprising depositing a copper gap-fill layer by:

exposing the substrate to a first copper solution containing free-copper ions; and

applying a second electrical bias across the substrate surface to deposit the copper gap-fill layer onto the copper seed layer.

21. (Previously Presented) The method of claim 20, further comprising depositing a copper bulk-fill layer by:

exposing the substrate to a second copper solution containing free-copper ions; and

applying a third electrical bias across the substrate surface to deposit the copper bulk-fill layer onto the copper gap-fill layer.

22. (Previously Presented) The method of claim 21, wherein at least one leveling agent is added to the first copper solution to form the second copper solution.

23. (Currently Amended) A method for electroplating a copper seed layer onto a barrier layer disposed on a substrate, comprising:

exposing ~~a substrate containing a~~ the barrier layer containing ruthenium to a complexed copper solution containing complexed copper ions derived from a copper source selected from the group consisting of copper citrate, copper borate, copper tartrate, copper oxalate, derivates thereof and combinations thereof; and

reducing the complexed copper ions with an electrical bias to form the copper seed layer on the barrier layer.

24. (Currently Amended) The method of claim 23, wherein the barrier layer ~~contains a material selected from the group consisting of cobalt, ruthenium, nickel, tungsten, tungsten nitride, titanium, titanium nitride, and silver~~ is deposited by an atomic layer deposition process or a physical vapor deposition process.

25. (Previously Presented) The method of claim 24, wherein the copper source is copper citrate.

26. (Currently Amended) The method of claim 24, wherein the electrical bias ~~generates~~ having a current density of less than about 10 mA/cm^2 is generated across a substrate surface.

27. (Previously Presented) The method of claim 26, wherein the current density is within the range from about 0.5 mA/cm^2 to about 3 mA/cm^2.

28. (Previously Presented) The method of claim 25, wherein the complexed copper solution has a copper concentration within the range from about 0.02 M to about 0.8 M.

29. (Cancelled)

30. (Previously Presented) The method of claim 28, wherein the copper seed layer has a thickness of less than about 200 Å.

31. (Previously Presented) The method of claim 23, further comprising depositing a copper gap-fill layer by:

exposing the substrate to a second copper solution containing free-copper ions; and

applying a second bias across a substrate surface to deposit the copper gap-fill layer onto the copper seed layer.

32. (Previously Presented) The method of claim 31, further comprising depositing a copper bulk-fill layer by:

exposing the substrate to a third copper solution containing free-copper ions; and

applying a third bias across the substrate surface to deposit the copper bulk-fill layer onto the copper gap-fill layer.

33. (Original) The method of claim 32, wherein at least one leveling agent is added to the second copper solution to form the third copper solution.

34. (Previously Presented) The method of claim 4, wherein the pH value is within a range from about 4.5 to about 6.5.

35. (Previously Presented) The method of claim 19, wherein the complexed copper solution has a pH value within a range from about 4.5 to about 6.5.

36. (Previously Presented) The method of claim 23, wherein the complexed copper solution has a pH value within a range from about 4.5 to about 6.5.